

**EVERETT CITY COUNCIL AGENDA ITEM COVER SHEET**

**PROJECT TITLE:**

Amendment No.2 to the	_____	Briefing
Professional Services	_____	Proposed Action
Agreement with Tetra Tech,	_____	Consent
Inc. for construction	<u>X</u>	Action
engineering support for the	_____	First Reading
Water Filtration Plant	_____	Second Reading
Programmed Logic Controllers	_____	Third Reading
Replacement Project	_____	Public Hearing
	_____	Budget Advisory

COUNCIL BILL #	_____
Originating Department	Public Works
Contact Person	Mike Robinson
Phone Number	(425) 257-8884
FOR AGENDA OF	November 2, 2016

Initialed by:  
 Department Head  
 CAA  
 Council President

<b><u>Location</u></b>	<b><u>Preceding Action</u></b>	<b><u>Attachments</u></b>	<b><u>Department(s) Approval</u></b>
6133 Lake Chaplain Road, Sultan, WA	08/06/12 Professional Services Agreement 12/10/14 Amendment No.1	Amendment No.2	Public Works

Amount Budgeted	\$1,100,000	
Expenditure Required	\$166,770	Account Number(s): UP 3361
Budget Remaining	\$324,393	
Additional Required	-0-	

**DETAILED SUMMARY STATEMENT:**

Additional time and funding is required for Tetra Tech, Inc. to complete construction support for the Water Filtration Plant Programmed Logic Controllers Replacement Project. The current Professional Services Agreement expires December 31<sup>st</sup>, 2016. This amendment will extend construction support services through December 31<sup>st</sup>, 2018.

A breakdown of the contract amount is as follows:

Original Contract Amount	\$608,837
<u>Amendment No.1</u>	<u>\$166,770</u>
Revised Contract Amount	\$775,607

**RECOMMENDATION (Exact action requested of Council):**

Authorize the Mayor to sign Amendment No.2 to the Professional Services Agreement with Tetra Tech, Inc. for construction engineering support for the Water Filtration Plant Programmed Logic Controllers Replacement Project in the amount of \$166,770.

**AMENDMENT NO. 2  
PROFESSIONAL SERVICES AGREEMENT  
BETWEEN THE CITY OF EVERETT  
AND TETRA TECH INC.**

This Amendment No. 2 is dated for reference purposes September 30<sup>th</sup>, 2016. It is by and between the City of Everett, a municipal corporation under the laws of the State of Washington ("City") and Tetra Tech Inc. ("Service Provider").

**RECITALS**

A. The City and Service Provider are parties to the Professional Services Agreement dated August 6<sup>th</sup>, 2012 (the "Agreement").

B. The City and the Service Provider desire to amend the Agreement for the purpose of adding engineering design and construction support services for the Water Filter Plant replacement.

**AGREEMENT**

The City and Service Provider agree as follows:

1. The Agreement is modified so that time of beginning and completion are as follows:

Time of Beginning and Completion of Performance: This Agreement shall commence as of the date of execution of this Agreement and shall be completed by December 31<sup>st</sup>, 2018.

2. The Agreement is modified so that total compensation, including all services and expenses, shall not exceed Seven Hundred Seventy Five Thousand, six hundred seven dollars (\$775,607).
3. The Work is modified to add the Work shown on Exhibit A1 and B1 to this Amendment.
4. Regardless of the date(s) on which this Amendment is signed by the parties, the parties agree that the Agreement has been continuously in effect since August 6<sup>th</sup>, 2012.
5. All provisions in the Agreement shall remain in effect except as expressly modified by this Amendment.

**CITY OF EVERETT**

**TETRA TECH, INC**  
**19803 North Creek Parkway**  
**Bothel, WA 98011**

By: \_\_\_\_\_  
Ray Stephanson, Mayor

By: *Kevin J. Dour*  
Typed/Printed Name: KEVIN J. DOUR  
Position/Office: DIRECTOR

\_\_\_\_\_  
Date

10/5/16  
Date

ATTEST

APPROVED AS TO FORM

\_\_\_\_\_  
Sharon Fuller, City Clerk

\_\_\_\_\_  
James D. Iles, City Attorney

Date: \_\_\_\_\_

Date: \_\_\_\_\_

## **EXHIBIT A1**

### **SCOPE OF WORK**

To maintain system operation, to satisfy newly developed buy-off protocols for the PLC replacement work, and to further enhance and support the networking and computer systems; Tetra Tech has been requested to provide this Proposal to perform additional work beyond the original Scope of work in order to complete the project. This Proposal is offered to obtain fair and reasonable compensation for these additional efforts.

#### **Additional scope items for Everett WFP PLC Replacement Project:**

**TASK 11 Additional meetings:**

We anticipate the need for additional on-site weekly meetings in order to more fully coordinate with the contractor and plant staff. These meetings are at either the Contractor's place of business in Everett, or the WFP. Based on current meeting frequency, we anticipate a total of 56 additional meetings through the conclusion of the project.

**TASK 12 Documentation of Program Comparisons**

Includes additional effort beyond the basic scope of work to perform Line-by-Line comparison of the AB programs migrated from distributed control panels to the centralized AB Master PLC program and develop a technical memo indicating differences and other findings. These original AB PLC routines were developed outside of Contracted services. This included line-by-line comparison for PLC programming in the following Phase 1 areas: Hypochlorite, Flocculation, Chemical Feed, Backwash Pump Station, Water Quality, Fluoride, Portal 4, Soda Ash, Recovered Water, Finished water pump station 1, and TI Master MCP. Detailed efforts included:

- Visually compare side-by-side verification that all routines and logic rungs are properly migrated from distributed PLCs and that they are fully represented within the master PLC logic.
- Ensure that routines and system Tags avoid potential naming conflicts due to consolidation
- Verify scaling, timer preset values, etc. are not affected by the consolidation
- Compare before and after ladder logic rungs within applicable subroutines observing that "local" addresses are updated to corresponding remote addresses where used. Also, observe that aliases to local and remote addresses within the global tag list maintains rack, slot and channel positions.
- Extract .CSV files for all tags within the old and new PLCs, obtain the DB2 Data Block file from Wonderware® and develop a comparison worksheet for each unit process area. Comparisons will use VLOOKUP within MS Excel to ensure that tags present within the original programs are also present within the

migrated master program, will present corresponding Wonderware® tags, and will highlight all tags between the PLCs that no longer match.

**TASK 13 PLC Program Documentation**

Additional reverse-engineering effort required to resolve missing or otherwise inaccurate legacy documentation (Tag and ladder rung descriptions) within the original TI 545 alternate backwash program. Efforts include:

- Program reverse Engineering efforts to determine program functionality for the Alternate Backwash Program.
- Develop coordinated timing diagrams for cascaded timers which do not have functional descriptions
- Trace down individual contacts which have missing or otherwise inaccurate tag name descriptions (number of tags could be in excess of 100 ea). Develop new descriptions for contacts and rungs which are lacking this information.

**TASK 14 Additional Start-up and Commissioning Assistance**

Validation efforts beyond basic start-up and commissioning assistance estimated in the base Contract. Estimated efforts within base contract Proposals included minimal effort to assist the Contractor during their startup efforts. Detailed Commissioning and documentation were not anticipated. Additional efforts for this task include the following:

- Provide services with on-site Tetra Tech personnel to implement field observation and detailed documentation for validation / sign-off related to I/O tag checkout. I/O Tags are verified functionally from the field instruments to the PLC and from the PLC to the SCADA HMI system.
- Provide services with on-site Tetra Tech personnel to implement field observation and documentation for validation / sign-off related to functional system-level testing of automated processes, interlocks and equipment. Functionality to be verified for applicable modes of operation including local manual, remote manual and automatic.

**TASK 15 Troubleshoot and Resolve Network Incompatibilities**

Troubleshoot and resolve existing N-Tron Switch issues which are causing a "data-storm" instability effect within the network.

- Troubleshooting the network issues; it is assumed based on current evidence that incompatible firmware versions and outdated existing hardware are destabilizing the network any time the redundant network ring is fully closed.
- Quality Controls Company (QCC) working under a separate Contract with Seahurst Electric will obtain updated firmware for N-tron Switches.
- QCC working under a separate Contract with Seahurst Electric will implement corrective efforts to include flashing firmware on several switches.

- QCC working under separate Contract with Seahurst Electric will upgrade the existing N-Tron 9000 switches to N-Tron 7900 series switches so their network health can be directly monitored by SCADA and N-view software. Hardware components required for upgrade will be procured directly by the COE plant Personnel.
- It was also found that the AOI's implemented within the Master PLC program and used to monitor the network parameters, causes excessive network traffic and unacceptable system latency. The AOI approach will be abandoned, and an alternative monitoring scheme using Simple Network Management Protocol (SNMP) will be developed in conjunction with an N-View OPC for data collection and display on the existing SCADA system.

**TASK 16 Filter Operation Documents**

Develop additional documentation for filters and their operation. These documents will be made available to City Personnel for their use and/or incorporated into the plant master drawing set:

- Develop Control strategies for each filter mode of operation in greater detail than per the original proposal. Document to include a detailed description of each backwash step, event and transition.
- Develop P&ID drawing for typical filter as no P&ID existed to-date
- Develop two separate Filter State Diagrams for filter automatic backwash sequences (Basic and Alternate) to assist in functional testing procedures

**Task 17 Additional Wonderware Support**

Additional Wonderware support development beyond simple coordination assumed for the original Proposal, Includes:

- Working with on-site Staff to fine-tune Filter Console #4 application program and guide them through the process of replicating and adapting this template to additional consoles 1 through 3.

**Task 18 Additional Construction Coordination**

Includes additional planning and on-site coordination with the Contractor for maintaining facility in operation while removing consoles (TI RIO Trunk, BWFE temporary connection, temporary reconnection for Air Scour system). Assist Contractor in identifying conductors, connections and equipment interfaces critical to maintaining functional use. Assume 6 site visits at 4 hours plus supervisor time in the office.

Also includes efforts to develop and implement temporary measures within Wonderware and the temporary filter PLC to maintain continuous operations for shared system resources and events. Additionally these measures helped facilitate effective communications between the existing TI PLC, master AB PLC, temporary filter PLC and multiple Wonderware applications.

Examples of shared resources and events which needed additional provisions included consolidating master flow rates between existing and new systems, bi-directional reporting of backwash events for filters running on different systems, interface with backwash pumping and flow control systems, etc.

**TASK 19 Spare I/O Implementation**

Efforts to field install and configure (retrofit) four new Remote I/O cards within remote I/O racks, and update the redundant Master PLC Processor to recognize and configure the new system inputs / outputs.

**TASK 20 Server Computer Hot Backup Setup and Software Installation**

Includes efforts to install software, set up and configure the secondary Stratus FTServer computer equipment, to support automatic fail-over of HMI applications present at remote terminals. This solution will leverage ACP ThinManager auto failover capabilities. Specific efforts for the secondary Stratus FTServer includes:

- Deploy a backup Domain Controller Virtual Machine (VM) on the secondary FTServer
- Create and configure virtual machines using Microsoft Hyper-V. The two Hyper-V licenses are included with the Server 2012 R2 Operating System, and will be utilized for this purpose.
- Set up on a second VM for server roles such as for Terminal Services, Application License Server, and Remote Desktop Services License Server "Client Access Licenses" (CALs.)
- Install and configure ACP ThinManager software and associated Remote Desktop Services (RDS) Host Servers for use with remote thin client machines in the Finished Water Pump Station 2, and the four replacement filter consoles.
- Load and Deploy developed Wonderware Intouch applications on the terminal services VM for five SCADA HMI thin clients in the FWPS2 and at the four Filter Consoles.
- Configure ACP ThinManager within Primary / Secondary Servers, and on Remote thin client terminals, for automatic fail-over operation.

**TASK 21 Stratus Server Uptime Layer Monitoring**

Off-site monitoring of the FTServer uptime layer will be provided via a Modem connection over telephone lease-line. Tetra Tech will provide services to facilitate this monitoring connection.

- Coordination of required connections to the FTServers.
- Purchase and install external data/fax modem C719 (Multitech ZBA Series) if required.
- Coordinate and implement modem configurations and FTServer remote monitoring service activations.

**Task 22 As-needed Engineering Service**

- a 5% Contingency Allowance for as-needed engineering and programming services is added herein to facilitate immediate corrections to any unforeseen conditions which are necessary to maintain plant operations and remedy various shortcomings to legacy programming during construction. Allowance will only be used upon explicit and specifically authorized work directive issued by COE Project Management.
- A sub-task has been developed for resolving Hypo feeder scaling issues and issues related to HMI displays within the Hypo area. QCC will be retained as a sub-consultant to Tetra Tech to perform these activities.



**EXHIBIT B1**  
**COMPENSATION**

☒ **ALTERNATE A [HOURLY RATE UP TO A MAXIMUM AMOUNT]**

The City shall pay the Service Provider a sum equal to the amount of hours actually worked multiplied by the rate identified herein for the staff performing the Work, subject to the maximum stated in ¶4(D) of this Agreement. For work performed in 2013 and beyond the rate increase is 4% per year.

Name	Responsibility	Rate
Licensed Electrician	Primary	\$110.88/hr
Licensed Electrician	Secondary	\$85.47/hr
Principal Engineer	Supervisory	\$246.64/hr
Senior Engineer	Project Manager	\$202.37/hr
Engineer	Field Investigation	\$158.48
CAD/Admin	Drafting & Administration	\$109.62

☐ **ALTERNATE B [LUMP SUM]**

The City shall pay Service Provider \_\_\_\_\_ dollars (\$) upon the completion of the Work, subject to the maximum stated in ¶4(D) of this Agreement.

☒ **ALTERNATE C [PROGRESS PAYMENTS]**

The City shall pay the Service Provider the following amounts upon the completion of the following tasks, subject to the maximum stated in ¶4(D) of the Agreement:

Task	Amount Paid upon Completion of Task	Task	Amount Paid upon Completion of Task
Task 0	\$47,430	Task 3.3.C	\$6,868
Task 1.A	\$11,244	Task 4.A	\$3,596
Task 1.B	\$8,683	Task 4.B	\$3,671
Task 1.C	\$8,981	Task 4.C	\$3,292
Task 2	\$20,102	Task 5	\$200,000
Task 3.1.A	\$25,504	Task 6	\$60,000
Task 3.1.B	\$21,301	Task 7.A	\$3,443
Task 3.1.C	\$18,388	Task 7.B	\$3,598
Task 3.2.A	\$17,562	Task 8	\$10,000
Task 3.2.B	\$15,882	Task 9	\$90,000
Task 3.2.C	\$15,652	Task 10	\$5,000
Task 3.3.A	\$4,709	Task 11	\$45,376
Task 3.3.B	\$3,931	Task 12	\$16,545

**ALTERNATE C [PROGRESS PAYMENTS] CONTINUED**

Task	Amount Paid upon Completion of Task	Task	Amount Paid upon Completion of Task
Task 13	\$8,272		
Task 14	\$22,086		
Task 15	\$2,782		
Task 16	\$5,420		
Task 17	\$10,105		
Task 18	\$8,878		
Task 19	\$1,358		
Task 20	\$13,034		
Task 21	\$8,965		
Task 22	\$23,949		

☐ **ALTERNATE D [BASE REGISTRATION]**

The city shall pay the Service Provider such amounts and in such manner as follows:  
Fee for service shall be       percent       % of the base registration fees collected by the City.  
Additional fees and/or surcharges levied by the City will be retained 100% by the City.  
Payments shall be made as stated in Exhibit A – Scope of Work. The base registration fee is  
listed in Exhibit A – Scope of Work. Compensation shall not exceed       dollars (\$       ).